

Practice Test

Test

Electrochemistry

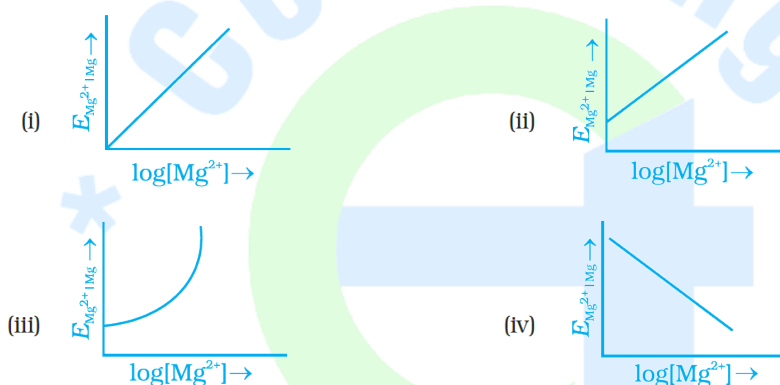
Q1 Which cell will measure standard electrode potential of copper electrode?

- (i) $\text{Pt}_{(s)} | \text{H}_{2(g)} (0.1 \text{ bar}) | \text{H}_{(aq)}^+ (1 \text{ M}) || \text{Cu}_{(aq)}^{+2} (1 \text{ M}) | \text{Cu}_{(s)}$
- (ii) $\text{Pt}_{(s)} | \text{H}_{2(g)} (1 \text{ bar}) | \text{H}_{(aq)}^+ (1 \text{ M}) || \text{Cu}_{(aq)}^{+2} (2 \text{ M}) | \text{Cu}_{(s)}$
- (iii) $\text{Pt}_{(s)} | \text{H}_{2(g)} (1 \text{ bar}) | \text{H}_{(aq)}^+ (1 \text{ M}) || \text{Cu}_{(aq)}^{+2} (1 \text{ M}) | \text{Cu}_{(s)}$
- (iv) $\text{Pt}_{(s)} | \text{H}_{2(g)} (1 \text{ bar}) | \text{H}_{(aq)}^+ (0.1 \text{ M}) || \text{Cu}_{(aq)}^{+2} (1 \text{ M}) | \text{Cu}_{(s)}$

Q2 Electrode potential for Mg electrode varies according to the equation

$$E_{\text{Mg}^{+2} / \text{Mg}} = E_{\text{Mg}^{+2} / \text{Mg}}^{\circ} - \frac{0.0591}{2} \log \frac{1}{[\text{Mg}^{+2}]}$$

The graph of $E_{\text{Mg}^{+2} / \text{Mg}}$ vs $\log [\text{Mg}^{+2}]$



Q3 Which of the following statement is not correct about an inert electrode in a cell?

- i) It does not participate in the cell reaction.
- ii) It provides surface either for oxidation or for reduction reaction.
- iii) It provides surface for conduction of electrons.
- iv) It provides surface for redox reaction.

Q4 Match the terms given in Column I with the items given in Column II.

Column I

Column II

- | | |
|-----------------------------------------|----------------------------------------|
| (i) Λ_M | (a) intensive property |
| (ii) E_{cell}° | (b) Depends on number of ions / volume |
| (iii) k | (c) extensive property |
| (iv) $\Delta_r G_{\text{Cell}}^{\circ}$ | (d) increases with dilution |

Note: In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

- a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.



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- c) Assertion is correct, but reason is wrong statement.
- d) Assertion is wrong but reason is correct statement.
- e) Both assertion and reason are wrong statements

- Q5 Assertion:
Conductivity of all electrolytes decreases on dilution.
Reason:
On dilution number of ions per unit volume decreases.
- Q6 Assertion :
 Λ_M for weak electrolytes shows a sharp increase when the electrolytic solution is diluted.
Reason:
For weak electrolytes degree of dissociation increases with dilution of solution.
- Q7 What would happen if the protective tin coating over an iron bucket is broken from some places?
- Q8 Write the electrode reactions for hydrogen electrodes and its potential & Write the symbolic notation for standard electrodes and its potential?
- Q9 Why does electrolysis of aqueous solution of NaBr and NaI give Br_2 and I_2 respectively whereas that of NaF gives O_2 instead of F_2 ?
- Q10 Give units of specific conductance and molar conductance?
- Q11 For what concentration of $Ag^+_{(aq)}$ will the EMF of the given cell be zero at $25^\circ C$. If the conc. of $Cu^{+2}_{(aq)}$ is $0.1 M$?
 $Cu_{(s)} | Cu^{+2} (0.1M) || Ag^+_{(aq)} | Ag_{(s)}$ Given $E^\circ_{Ag^+/Ag} = +0.80V$, $E^\circ_{Cu^{+2}/Cu} = 0.34V$
- Q12 Calculate E_{cell} for the cell $Al_{(s)} | Al^{+3} (0.1 M) || Fe^{+2} (0.02 M) | Fe_{(s)}$ Given $E^\circ_{Al^{+3}/Al} = -1.66V$, $E^\circ_{Fe^{+2}/Fe} = -0.44V$
- Q13 How many grams of chlorine can be produced by electrolysis of molten NaCl with a current of 1.0 Amp for 15 minutes?
- Q14 State Kohlrausch's law of independent migration of ions. How does this help in determining the molar conductivity of H_2CO_3 at infinite dilution?
- Q15 The molar conductance of NaOH, NaCl and $BaCl_2$ at infinite dilution is 2.481×10^{-2} , 1.265×10^{-2} and $2.800 \times 10^{-2} \Omega^{-1}cm^2 mol^{-1}$ respectively. Calculate Λ° for $Ba(OH)_2$?
- Q16 Silver is electro-deposited on a metallic vessel of surface area $800 cm^2$ by passing a current 0.2 ampere for 3 hours. Calculate the thickness of silver deposited. Given the density of silver as $10.78 gm/cc$ (Atomic mass of Ag = 107 amu)
- Q17 Two half cells are $Al^{+3}_{(aq)}/Al$ and $Mg^{+2}_{(aq)}/Mg$ The reduction potentials of these half cells are $-1.66 V$ and $-2.36 V$ respectively. Calculate the cell potential also write the cell reaction?
- Q18 What is corrosion? Briefly explain methods of prevention of corrosion?



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